

5

**C L A I M S**

10

1. Device for detecting breathing activity of a person comprising provisions for supplying a first signal indicative with respect to breathing gas flow; and at least one signal processing means for processing said first signal; said signal processing means being construed so as to generate
  - a reference relation on the basis of said first signal detected over a first time period; and
  - 15 - a correlation-relation between said reference-relation and said first signal; said signal processing means being further construed so as
    - to generate on the basis of an observation of said correlation-relation an output signal which is indicative with respect to the breathing activity or the physiological condition of the breathing person and
    - 20 - to adjust the breathing gas pressure control in accordance with said output signal.

25

2. Device according to claim 1, characterized in that the duration of said first time period is set so as to cover at least two breathing cycles.

30

3. Device according to claim 2, characterized in that there is provided a second means for supplying a second signal indicative with respect to the dynamic and/or static breathing gas pressure.
4. Device according to at least one of claims 1 to 3, characterized in that there is provided a band-pass means for filtering or dampening said first and/or second signal.

5. Device according to at least one of claims 1 through 4, characterized in that said signal processing means comprises a smoothing means for smoothing said reference relation on the basis of selected smoothening criteria.
- 5 6. Device according to at least one of claims 1 through 5, characterized in that said smoothing criteria are adaptively changed.
7. Device according to at least one of claims 1 through 6, characterized in that said signal processing means comprises a smoothing means for smoothening  
10 said reference relation.
8. Device according to at least one of claims 1 through 7, characterized in that at least one of said smoothing means is construed so as to operate on the basis of statistic concepts.  
15
9. Device according to at least one of claims 1 through 8, characterized in that said signal processing means comprises a threshold-observation-means for analyzing said correlation-relation with respect to threshold-criteria in particular zero-crossings.  
20
10. Device according to at least one of claims 1 through 9, characterized in that said signal processing means comprises a counting-means for counting occurrence of predetermined criteria within a predetermined time-period
- 25 11. Device according to at least one of claims 1 through 10, characterized in that said bandpass- or smoothening parameters are adaptively changed.
12. Device for supplying breathing gas to a patient above ambient pressure, comprising a feeding means for feeding said breathing gas and a detection means for detection of the breathing gas pressure and/or the breathing gas flow characterized by a signal processing means which generates a reference  
30 relation on the basis of said detected signals and which adjusts the breathing gas pressure on the basis of a correlation between said reference relation and the prevailing breathing pattern.

- 5 13. Method for controlling the breathing gas pressure during CPAP-Therapy including detecting signals indicative with respect to a breathing gas pressure and the breathing gas flow, and determining on the basis of the time-dynamic of the pressure or the breathing gas flow the presence of a flow-limitation and/or the degree of a flow-limitation and adjusting the breathing gas pressure in line therewith.
- 10 14. Method according to claim 13, characterized in that the time-points off the beginning of Inspiration- and/or Expiration are determined in consideration of the inclination of a curvature portion off the gas flow by using statistic smoothing methods and wherein a significant variation of the distance between the ends of Inspiration- or Expiration is determined with respect to a number of subsequent breathing cycles.
- 15 15. Method according to claim 13 or 14, characterized in that irregularities within the flow are detected by comparing the present breathing cycle with preceding breathing cycles by using statistic dependency-measurements.
- 20 16. Method according to claim 15 characterized in that as a dependency-measurement there are detected correlation-coefficients and/or mutual-informations.
- 25 17. Method according to at least one of claims 13 through 16, characterized in that a correlation-relation between a reference-function and the actual breathing gas flow is generated and wherein upon minor statistic dependency between said actual flow and the preceding breathing cycles the breathing gas pressure is adjusted accordingly.
- 30 18. Method according to at least one of claims 13 through 17 characterized in that groups of breathing cycles are standardized by an affine-transformation and that the average curvature-radius of a standardized breath is considered for the detection of flow limitations.

19. Method for controlling respiratory gas supply pressure during CPAP-therapy including detection of sleeping position of the patient, in particular head position, and/or torsi position, or neck torsion degree, wherein a target respiratory pressure and/or the control behavior of the respiratory gas supply is set in dependency of these detections.

20. Method for controlling respiratory gas supply pressure during CPAP-therapy including detection of a signal indicative with respect to respiratory flow of a patient, wherein said signal is subjected to an analysis of correlation on the basis of a adaptively actualized reference function, wherein on the basis of the results of the correlation analysis the physiological state of a patient is typified and wherein for control of respiratory gas pressure, in particular for setting a target respiratory gas pressure the control behavior of a breathing gas control means is adjusted on the basis of the typified physiological state.

21. Method according to claim 20, characterized in that for selected sleep states of the patient there are provided respective adapted pressure control modes.

22. Method according to claim 21, characterized in that the sleep position of the patient, in particular the head position, and/or the torsi position, and or the neck torsion degree are detected and that the respiratory pressure and/or the pressure control behavior are determined in consideration of these detections.

23. Method for controlling respiratory gas supply pressure during CPAP-therapy including detection of a signal indicative with respect to respiratory flow of a patient, wherein said signal is subjected to an analysis of correlation on the basis of a adaptively actualized reference function, wherein on the basis of the results of the correlation analysis the physiological state of a patient is typified and wherein in dependency of the result of typification the pressure control is administered so as to provide substantially the same static respiratory gas pressure in breathing mask region, or to provide different static mask pressure levels for inspiration and expiration (bilevel mode).